

CLAIMS

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1. An injectable micro-implantation system for filling
bodily defects including the augmentation of soft tissue,
comprising in combination:
an amount of biologically compatible micro particles dispersed
in a compatible physiological vehicle, the micro
particles being further characterized by a textured
surface having a plurality of surface irregularities
generally randomly formed therein;
the textured micro particles having a combination of average
particle size range and average particle texture which
cooperate to substantially prevent loss of the prosthetic
particles from the injection site.
2. An injectable micro-implantation system for filling
bodily defects including the augmentation of soft tissue,
comprising in combination:
biologically inert micro particles of a relatively malleable
material dispersed in a compatible physiological vehicle,
the micro particles being further characterized by a
textured surface having a plurality of indentations,
cavities and pores generally randomly formed therein;
the textured micro particles having an average particle size
generally between 30 and 3000 microns with the dimension
of the openings formed by the indentations, cavities and
pores within the particles being generally in a range
between 10 angstroms and 500 microns;
the relative average particle size range and average
dimensions of the openings formed by the indentations,
cavities and pores being sufficient in combination to

17 substantially preclude migration of the particles from
18 the injection site.

1 3. The injectable micro-implantation system of Claim 2
2 further comprising an amount of at least one surface modifier to
3 assist in detoxification and/or promote tissue ingrowth.

1 4. The injectable micro-implantation system of Claim 3
2 wherein the surface modifier is incorporated into the micro
3 particle prior to particle formation.

1 5. The injectable micro-implantation system of Claim 3
2 wherein said surface modifier is selected from the group consisting
3 of polyvinyl pyrrolidone, collagen and an hyaluronate.

1 6. The injectable micro-implantation system of Claim 2 being
2 particularly characterized in that the compatible physiological
3 vehicle is a bodily compatible fluid selected from the group
4 consisting of hydrogels, glucose, starch, silicone fluid fat and a
5 lower hyaluronate.

1 7. The injectable micro-implantation system of Claim 2 being
2 particularly characterized in that the biologically inert micro
3 particles are formed of bodily compatible solids selected from the
4 group consisting of silicone rubbers, polytetrafluoroethylene,
5 polyethylene, and other biologically inert polymer materials.

1 8. The injectable micro-implantation system of Claim 7 being
2 particularly characterized in that the biologically inert micro
3 particles are of a generally uniform configuration.

1 9. The injectable micro-implantation system of Claim 8 being
2 particularly characterized in that the average particle sizes is at
3 least 80 microns.

1 10. The injectable micro-implantation system of Claim 8 being
2 particularly characterized in that the range of average particle
3 size is between 60 microns and 600 microns.

1 11. The injectable micro-implantation system of Claim 8 being
2 particularly characterized in that the range of average particle
3 size is between 100 microns to 600 microns.

1 12. The injectable micro-implantation system of Claim 8
2 further characterized in that the relatively malleable material is
3 poly(dimethylsiloxane) and the physiological vehicle is a hydrogel
4 of polyvinyl pyrrolidone.

1 13. The injectable micro-implantation system of Claim 9
2 further characterized by microparticles having a textured surface
3 of indentations, cavities and pores of an average size between
4 about 10 and about 200 microns.

1 14. The injectable micro-implantation system of Claim 10
2 further characterized by microparticles having a textured surface
3 of indentations, cavities and pores of an average size between
4 about 10 and about 200 microns.

1 15. The injectable micro-implantation system of Claim 11
2 further characterized by microparticles having a textured surface
3 of indentations, cavities and pores of an average size between
4 about 10 and about 200 microns.

1 16. The injectable micro-implantation system of Claim 10
2 further characterized in that the relatively malleable material is
3 poly(dimethylsiloxane) and the physiological vehicle is a hydrogel
4 of polyvinyl pyrrolidone.

1 17. The injectable micro-implantation system of Claim 8
2 particularly characterized in that:

3 the relatively malleable material is poly(dimethylsiloxane);
4 the physiological vehicle is a hydrogel of polyvinyl
5 pyrrolidone;

6 the range of average particle size is between 60 microns and
7 600 microns; and

8 microparticles have a textured surface of indentations,
9 cavities and pores of an average size between about 10
10 and about 200 microns.

1 18. The injectable micro-implantation system of Claim 8
2 particularly characterized in that:

3 the relatively malleable material is poly(dimethylsiloxane);
4 the physiological vehicle is a hydrogel of polyvinyl
5 pyrrolidone;

6 the range of average particle size is between 100 microns and
7 600 microns; and

8 microparticles having a textured surface of indentations,
9 cavities and pores of an average size between about 10
10 and about 200 microns.

1 19. The injectable micro-implantation system of Claim 8
2 wherein the micro particles are generally spherical in shape.

1 20. The injectable micro-implantation system of Claim 2 being
2 particularly characterized in that the biologically inert micro
3 particles are of a generally uniform configuration.

1 21. The injectable micro-implantation system of Claim 13
2 wherein the micro particles are generally spherical in shape.

1 22. The injectable micro-implantation system of Claim 14
2 wherein the micro particles are generally spherical in shape.

1 23. The injectable micro-implantation system of Claim 15
2 wherein the micro particles are generally spherical in shape.

1 24. The injectable micro-implantation system of Claim 17
2 wherein the micro particles are generally spherical in shape.

1 25. The injectable micro-implantation system of Claim 18
2 wherein the micro particles are generally spherical in shape.

1 26. A non-migratory injectable micro-implantation system for
2 the filling of bodily defects including long-term augmentation of
3 soft tissue, comprising in combination:

4 biologically inert micro particles dispersed in a compatible
5 physiological vehicle, the micro particles being further
6 characterized by a textured surface having a plurality of
7 surface irregularities generally randomly formed therein;
8 the textured micro particles having an average particle size
9 and texture combination range and average particle
10 texture such that migration from the injection site is
11 substantially precluded and individual particle non-
12 inflammatory scar tissue encapsulation occurs.

1 27. An injectable micro-implantation system for filling
2 bodily defects including the augmentation of soft tissue,
3 comprising in combination:

4 biologically inert micro particles of a relatively malleable
5 material dispersed in a compatible physiological vehicle,
6 the micro particles being of a generally uniform
7 configuration and being further characterized by a
8 textured surface having a plurality of indentations,
9 cavities and pores separated by connective members
10 generally randomly formed therein;
11 the textured micro particles having an average particle size
12 generally between 30 and 3000 microns with the dimension
13 of the openings formed by the indentations, cavities and
14 pores within the particles being generally in a range
15 between 10 angstroms and 500 microns; and
16 the relative average particle size range and average
17 dimensions of the openings formed by the indentations,
18 cavities and pores being sufficient in combination to

19 substantially preclude migration of the particles from
20 the injection site and to achieve adequate guidance of
21 fibroblasts such that a scar tissue pattern is developed
22 that assumes a configuration that is generally a mirror
23 image of the particle surface.

1 28. A method of substantially preventing transitory
2 host/prostheses interface motion of the particulate matter in an
3 injectable micro-particle implantation system for filling bodily
4 defects including the augmentation of soft tissue comprising the
5 step of:

6 subcutaneously injecting an amount of the textured micro
7 particles further characterized by a textured surface
8 having a plurality of indentations, cavities and pores
9 and having an average particle size generally between 30
10 and 3000 microns with the dimension of the openings
11 formed by the indentations, cavities and pores within the
12 particles being generally in a range between 10 angstroms
13 and 500 microns; and the relative average particle size
14 range and average dimensions of the openings formed by
15 the indentations, cavities and pores being sufficient in
16 combination to substantially preclude migration of the
17 particles from the injection site.

1 29. The method of Claim 28 further comprising the step of
2 adding a biologically active surface modifier to the injected
3 material either as separate material or integral with the particles.

1 30. An injectable micro-implantation system for filling
2 defects in bodily tissues including augmentation of soft tissue,
3 comprising in combination:

4 biologically inert micro particles dispersed in a compatible
5 physiological vehicle, the micro particles characterized

6 by a textured surface having a plurality of indentations,
7 cavities and pores separated by outwardly projecting
8 connective members generally randomly formed therein;
9 the textured micro particles further being characterized by an
10 average particle size generally between 30 and 3000
11 microns and with the dimension of the openings formed by
12 the indentations, cavities and pores within the particles
13 being generally between 10 Angstroms and 500 microns; and
14 the relative average particle size range and average
15 dimensions of the openings formed by the indentations,
16 cavities and pores being sufficient in combination to
17 substantially preclude migration of the particles from
18 the injection site.

1 31. The injectable micro-implantation system of Claim 30
2 being particularly characterized in that the compatible
3 physiological vehicle is a bodily compatible fluid selected from
4 the group consisting of hydrogels, glucose, starch, silicone fluid
5 fat and lower hyaluronates.

1 32. The injectable micro-implantation system of Claim 30
2 being particularly characterized in that the biologically inert
3 micro particles are formed of bodily compatible solids selected
4 from the group consisting of silicone rubbers,
5 polytetrafluoroethylene, polyethylene, and other biologically inert
6 polymer materials.

1 33. The injectable micro-implantation system of Claim 30
2 being particularly characterized in its biologically inert micro
3 particles are of a generally uniform configuration.

1 34. The injectable micro-implantation system of Claim 30
2 wherein the surface irregularities in the biologically inert micro
3 particles are generally between 10 and 200 microns.

1 35. An injectable micro-implantation system for filling
2 defects in bodily tissue including augmentation of soft tissue,
3 comprising in combination:

4 biologically inert relatively malleable micro particles of
5 a generally uniform configuration dispersed in a
6 compatible physiological vehicle, consisting essentially
7 of a bodily compatible fluid selected from the group
8 consisting of glucose, starch, silicone fluid, fat and a
9 lower hyaluronate, the micro particles being
10 characterized by a textured surface having a plurality of
11 indentations, cavities and pores separated by outwardly
12 projecting connective members generally randomly formed
13 therein, wherein the biologically inert micro particles
14 are formed of bodily compatible solids selected from the
15 group consisting of silicone rubbers,
16 polytetrafluoroethylene, polyethylene, and other
17 biologically inert polymer materials; and

18 the textured micro particles further being characterized by an
19 average particle size generally between 60 and 600
20 microns and with the dimension of the surface
21 irregularities formed by the indentations, cavities and
22 pores within the particles being generally between 20
23 Angstroms and 200 microns.

1 36. The injectable micro-implantation system of Claim 30
2 further comprising at least one surface modifier to assist in
3 detoxification and/or promote tissue ingrowth.

1 37. The injectable micro-implantation system of Claim 36
2 wherein the surface modifier is dispersed in the physiological
3 vehicle.

- 1 38. The injectable micro-implantation system of Claim 36
2 wherein the surface modifier is biologically active.
- 1 39. The injectable micro-implantation system of Claim 37
2 wherein the surface modifier is biologically active.
- 1 40. The injectable micro-implantation system of Claim 38
2 wherein the modifier is selected from the group consisting of
3 fibronectin and cytokines.
- 1 41. The injectable micro-implantation system of Claim 36
2 wherein said surface modifier is selected from the group consisting
3 of polyvinyl pyrrolidone, collagen and an hyaluronate.
- 1 42. The injectable micro-implantation system of Claim 35
2 further comprising at least one surface modifier to assist in
3 detoxification and promote tissue ingrowth.
- 1 43. The injectable micro-implantation system of Claim 41
2 wherein said surface modifier is selected from the group consisting
3 of polyvinyl pyrrolidone, collagen and an hyaluronate.
- 1 44. The injectable micro-implantation system of Claim 31
2 wherein said surface modifier is selected from the group consisting
3 of polyvinyl pyrrolidone, collagen and an hyaluronate.
- 1 45. The injectable micro-implantation system of Claim 32
2 wherein said surface modifier is selected from the group consisting
3 of polyvinyl pyrrolidone, collagen and an hyaluronate.
- 1 46. The injectable micro-implantation system of Claim 3
2 wherein the surface modifier is dispersed in the physiological
3 vehicle.
- 1 47. The injectable micro-implantation system of Claim 3
2 wherein the surface modifier is biologically active.
- 1 48. The injectable micro-implantation system of Claim 46
2 wherein the surface modifier is biologically active.

1 49. The injectable micro-implantation system of Claim 48
2 wherein the modifier is selected from the group consisting of
3 fibronectin and cytokines.

1 50. The injectable micro-implantation system of Claim 3
2 wherein the modifier is selected from the group consisting of
3 fibronectin and cytokines.